REMARKS

The Final Office Action mailed May 16, 2006 has been carefully reviewed and these remarks are responsive thereto. Claims 1-14 and 27-31 are pending in this application. Reconsideration and allowance of the instant application are respectfully requested in view of the amendments and remarks presented in this response.

Title

The title is objected to for not being descriptive of the invention to which the claims are directed. The title has been amended accordingly.

Claim Rejection Under 35 USC §112

Claims 1-14 and 27-31 stand rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement because the limitation in claim 1 of "simultaneously extruding..." is not described in the specification or explicitly supported in the drawings. Applicants respectfully traverse this rejection. The Office Action states that Fig. 4 and paragraph [46], lines 1-3 "clearly teach that core (24) and shell (26) are formed prior to being extrude together at step (30, Fig. 4)," which provides support for the assertion that the limitation of "simultaneously extruding" is new matter. In addition, the Advisory Action alleges that the claim limitation of "simultaneously "co-extruding" a first composition and a second composition to form one or more "two-component" filaments" while eliminating the limitation of "extruding the one or more filaments" changes the scope of the claims, which would require further consideration and search. Applicants respectfully disagree.

Figure 4 and paragraph [46] relate to one embodiment of the invention that is a non-continuous process of preparing filaments. In other embodiments, continuous processes for forming filaments may be employed. (*See, e.g.,* page 13, paragraph [46], lines 8-10; page 15, paragraph [56], lines 4-8). Nonetheless, irrespective of whether the first and second compositions are introduced in a non-continuous or continuous manner into the extruder, they are simultaneously co-extruded to form a two-component filament.

Even if the initial steps, such as the forming of the core and shell and forming of a feed rod for the extruder in Fig. 4, were extrusion processes, the specification discloses that the

core/first composition and the shell/second composition are co-extruded to form the filament that forms the heat exchanger green body. (*See, e.g.,* page 13, paragraph [46], lines 3-4 ("The core and shell are combined into a feed rod 28, which is extruded..."). Further support for the limitation "simultaneously extruding" can be found at pages 4-5, paragraph [11] ("Methods of fabricating the heat exchanger devices include preparing and ***extruding a two-component filament*** that generally ***includes an inner core material surrounded by an outer shell material***....Fabrication of the heat exchanger devices ***from a solid filament***, the core of which is ultimately removed, allows formation of a plurality of internal, generally uniform microchannels.") (emphasis added). Applicants respectfully submit that the limitation "simultaneously extruding" is supported by the specification and is not new matter.

In order to expedite prosecution of this application, claim 1 has been amended to further emphasize that the first and second compositions are co-extruded to form a two-component filament. As also recited in claim 1, this two-component filament that results from co-extrusion of the first and second compositions is formed into the heat exchanger green body, with the first and second compositions thus being deposited at the same time in a single step. Support for this (and the prior) amendment can be found throughout the specification, such as at paragraphs 11, 32, 34, 46 and 56, and in the drawings, such as Figs. 1 and 4. No new matter has been added.

The amendments to claim 1 do not change the scope of the claims but instead, further clarify that a single extrusion step provides a filament including two components. Amended claim 1 now recites in part, "simultaneously co-extruding a first composition and a second composition to form one or more two-component filaments, the one or more filaments including the first composition encased in the second composition." The amendments to claim 1 provide an alternate, clarified way of stating the limitation as originally claimed ("simultaneously extruding a first composition and a second composition to form one or more filaments, the one or more filaments including the first composition encased in the second composition"). In order to form one or more filaments by extrusion when the exruded filaments include a first composition encased in a second composition, the first and second compositions must be extruded at the same time, or in other words, "simultaneously" or "co-extruded". Similarly, calling a filament that has been described to include a first composition encased in a second composition a "two-component" filament does not change the scope of the filament limitation.

Withdrawal of this rejection is respectfully requested.

Claim Rejection Under 35 USC §102

Claims 1-2, 5-6 and 27-31 stand rejected under 35 USC §102(e) for being unpatentable over Musso et al., U.S. Publication No. 2003/0173720 ("Musso"). Applicants traverse this rejection.

Amended claim 1 recites a method for manufacturing a heat exchanger that includes first simultaneously co-extruding a first composition and a second composition to form one or more two-component filaments, with the filament comprising the first composition encased in the second composition. The one or more two-component filaments are mechanically arranged to form a green body. Thus, the first and second compositions are arranged in a single step because they are both present in the filament. The green body then is subject to conditions effective for removing the first composition and for sintering the second composition to provide the heat exchanger.

Musso, in contrast, teaches a multi-step process for forming the intermediate structure or green body. More specifically, Musso discloses forming a body around core members by initially placing the core members in a fixture in a first step and then subsequently filling the spaces around the core members with a matrix forming material in a second step. Musso fails to teach a process in which both the core and body materials can be arranged in a single step to form the intermediate structure.

Moreover, Applicants respectfully submit that the method of Musso is a "non-simultaneous" method because the core members are first formed then arranged and then the body is formed around the core members in a separate step. "Simultaneous" is defined as "existing or occurring at the same time; exactly coincident." (*See, e.g.,* Merriam-Webster's Collegiate Dictionary, 10th ed., p. 1091 (2000)). The step-wise construction taught by Musso is not "simultaneous."

A comparison of FIG. 14 of Musso to FIG. 4 of the present application further illustrates the significant disparity in the two methods for fabricating heat exchangers. As shown in FIG. 14 of Musso, the core members and molding material are processed *sequentially* to form the

intermediate structure or body. In contrast, as shown in FIG. 4 of the present application, the intermediate structure or green body may be formed from an extruded two-component filament 36 in a single step. This is possible because the first, or inner, composition of the one or more two-component filaments comprises the removable core composition that forms the heat exchanger channels and the second, or outer, composition of the one or more two-component filaments comprises the composition for forming the green body. The extruded two-component filament may be deposited directly to form the heat exchanger structures.

Musso does not disclose or suggest forming a heat exchanger intermediate structure from one or more two-component co-extruded filaments comprising a first composition encased in a second composition, as claimed. The manufacturing methods of Musso are appreciably different from the claimed methods. Consequently, Musso fails to teach all of the limitations of claim 1. For at least the same reasons, Musso also does not teach all of the limitations of dependent claims 2, 5-6 and 27-31. Applicants therefore respectfully request withdrawal of this ground for rejection.

Claim Rejection Under 35 USC §103

Claim 3 stands rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Hoopman et al., U.S. Patent No. 5,317,805 ("Hoopman et al."). Claim 4 stands rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Hoopman as applied to claim 3 and further in view of Davenport, U.S. Patent No. 3,222,144 ("Davenport"). Claim 7 stands rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Hanaki et al., U.S. Patent No. 4,746,479 ("Hanaki et al."). Claims 8-10 stand rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Avakian, Publication No. US 2004/0106713 ("Avakian"). Claims 8 and 9 alternatively stand rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Ocher et al., Publication No. US 2003/0131476 ("Ocher et al."). Claims 11 and 12 stand rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Rainer et al., U.S. Patent No. 5,533,258 ("Rainer et al."). Claim 13 stands rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of Rossi, Publication No. US 2002/0037142 ("Rossi"). Claim 14 stands rejected under 35 USC §103(a) for being unpatentable over Musso et al., in view of McCullough, U.S. Patent No. 6,093,961 ("McCullough").

As discussed above in connection with independent claim 1, Musso et al. fail to disclose, teach or suggest a method for manufacturing a heat exchanger by co-extruding two compositions, namely a first composition for forming the channels of the heat exchanger and a second composition for forming a green body, to provide a filament and arranging the two-component filament to provide the structure of the heat exchanger. Rejected claims 3, 4, 7-14 depend from claim 1. None of Hoopman et al., Davenport, Hanaki et al., Avakian, Ocher et al., Rainer et al., Rossi, and McCullough disclose or suggest the method of manufacture as claimed and do not provide any teachings to cure the deficiencies of Musso et al. Accordingly, none of the cited references, either alone or in combination, disclose, teach or suggest the invention of claims 3, 4, 7-14, and claims 3, 4, 7-14 are not obvious. Consequently, withdrawal of these rejections under 35 USC §103(a) are respectfully requested.

CONCLUSION

In view of the above amendments and remarks, prompt reconsideration and full allowance of the claims pending in the subject application are respectfully requested. All rejections have been addressed and no new matter has been added. Applicants respectfully submit that the instant application is in condition for allowance and respectfully solicit prompt notification of the same.

The Commissioner is authorized to debit or credit our Deposit Account No. 19-0733 for any fees due in connection with the filing of this response.

If the Examiner has any questions, the Examiner is invited to contact the undersigned at the number set forth below.

Respectfully submitted,

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